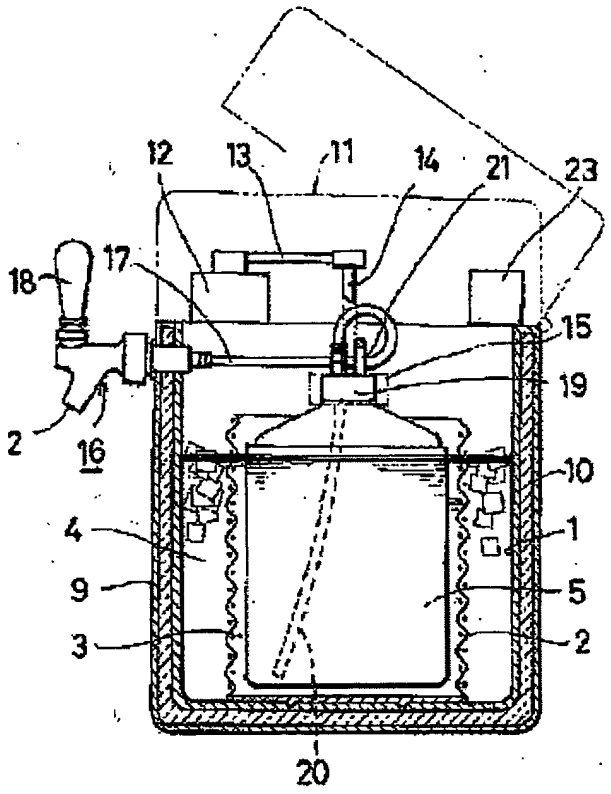
METHOD AND DEVICE FOR COOLING LIQUID CONTAINER

Patent number: JP2002013855
Publication date: 2002-01-18
Inventor: TAKATSUKI TOYOHIKO; NISHIKAWA KAZUHIRO
Applicant: ZOJIRUSHI CORP
Classification:
- international: F25D3/08; B67D1/08
- european:
Application number: JP20000192614 20000627
Priority number(s): JP20000192614 20000627

Abstract of **JP2002013855**

PROBLEM TO BE SOLVED: To materialize a cooler which can cool a relatively large capacity of can beer or the like to a temperature fit for drinking in the shortest time possible, by using ice. SOLUTION: A protective frame 2 such as a net cage or the like which passes water and does not pass ice is arranged in a main body container 1, and the inward of the protective frame is made a cooling chamber 3, and the outward is made an ice chamber 4, and ice is cast in this ice chamber 4, and also a specified quantity of water is poured in the container main body 1. A liquid container 5 such as can beer is arranged, in such a way as to be supported from above, in the cooling chamber 3 inside the protective frame 2, and the liquid container 5 supported from above is turned or rotated. Hereby, the ice does not get in the way when the user mounts or replace the main body container 1, and besides the cooler can cool it in a short time.



Data supplied from the ***esp@cenet*** database - Worldwide

* NOTICES *

1.This document has been translated by computer.·So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] The liquid-container cooling approach characterized by rotation of said liquid container being the repeat of forward rotation and inverse rotation in the approach of cooling a liquid container by arranging a liquid container in the liquefied heat carrier cooled, and rotating this liquid container.
[Claim 2] The liquid-container cooling approach characterized by rotation of said liquid container being an intermittent rotation drive in the approach of cooling a liquid container by arranging a liquid container in the liquefied heat carrier cooled, and rotating this liquid container.
[Claim 3] The liquid-container cooling approach characterized by rotation of said liquid container being the repeat of a high speed and a low speed in the approach of cooling a liquid container by arranging a liquid container in the liquefied heat carrier cooled, and rotating this liquid container.
[Claim 4] The liquid-container cooling system characterized by to rotate or rotate either or the both sides of the liquid container arranged in a cold-water room, or a body container while arranging the protection frame which does not let big ice pass through water inside [in which ice and water are held] a body container, forming the cold-water room where an icy lump's inflow was prevented with this protection frame and arranging liquid containers, such as canned beer, in this cold-water room.
[Claim 5] The tubed protection frame which does not let big ice pass through water inside [in which ice and water are held] a cylinder-like body container is arranged. The liquid-container cooling system which makes a way a cold-water room for the space of this protection frame and a body container wall among Himuro and a protection frame, and is characterized by rotating or rotating the liquid container which has arranged so that liquid containers, such as canned beer, may be supported from the upper part inside a cold-water room, and was supported in this upper part inside a cold-water room.
[Claim 6] The tubed protection frame which does not let big ice pass through water inside the body container which laid the body container of the shape of a cylinder which holds ice and water on the rotation base, and was laid on this rotation base is arranged. The liquid-container cooling system which makes a way a cold-water room for the space of this protection frame and a body container wall among Himuro and a protection frame, and is characterized by holding liquid containers, such as canned beer, in the interior of a cold-water room, and rotating or rotating a body container by rotation of a rotation base.
[Claim 7] The liquid-container cooling system according to claim 6 characterized by forming the projection of the shape of a rib of a lengthwise direction in the internal surface of a body container.
[Claim 8] The liquid-container cooling system according to claim 4 to 7 characterized by equipping with a cross-sectional deformation attachment the liquid container arranged in a cold-water room, and making a cross-section configuration deform into the configuration except circular.
[Claim 9] The liquid-container cooling system according to claim 4 to 8 characterized by rotating a body container and/or a liquid container intermittently.
[Claim 10] The liquid-container cooling system according to claim 4 to 8 characterized by changing high-speed rotation and low-speed rotation of the rotational speed of a body container and/or a liquid container during rotation intermittently.
[Claim 11] A body container and/or a liquid container are a liquid-container cooling system according to claim 4 to 8 characterized by carrying out forward reverse reversal of the rotation of a fixed include angle within the limits, and performing it.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is invention about the equipment which realizes effectively the cooling approach for cooling quickly canned drinks, such as canned beer, and a PET bottle and the liquid container of a drink and others containing a paper pack, and this approach.
[0002]
[Description of the Prior Art] As equipment for drinking drinks containing a container, such as canned beer, as much as possible for a short time, and cooling to the temperature at the time, so that it may be indicated by JP,10-141825,A So that it may be indicated by what prepares a rotation base into the container containing ice, is made to rotate a drink can directly, and is cooled, and JP,10-141827,A What rotates the drink can which the drink can was made to adsorb, held horizontally and was horizontally held with the sucker prepared in the motor shaft in the container containing ice is known.
[0003]
[Problem(s) to be Solved by the Invention] Since each of above and conventional cooling systems was the things equipped with liquid containers, such as a can which it is going to cool to the space where ice or ice, and water are intermingled, they had the fault of ice becoming obstructive and being hard to equip when equipping with a liquid container, and the fault that rotation of a can etc. was checked on ice. Moreover, the revolving shaft of a motor may be damp for any cooling system indicated by JP,10-141825,A and JP,10-141827,A. Therefore, the motor shaft needed to be made into positive seal structure.
[0004] This invention aims at offering the cooling approach and equipment which can cool a liquid container as more quickly [than the conventional thing] as possible while ice does not become obstructive but it offers a cooling system convenient handling in view of the fault of the above-mentioned conventional technique, when equipping with a liquid container. Usually for cooling especially canned beer, such as a liquid container, 2l. which is large capacity comparatively, and 3l., to temperature at the drinker time, long duration is required. When such, it enables it to cool this invention for a short time of 5 - 15 minutes. Furthermore, it shall be made not damp [a revolving shaft] in water, and the seal device of a motor shaft shall be omitted.
[0005]
[Means for Solving the Problem] As an approach for attaining the above-mentioned purpose, this invention arranges a liquid container in the liquefied heat carrier cooled, and cools a liquid container by rotating this liquid container. Furthermore, the liquid container to rotate repeats forward rotation and inverse rotation, and it is made to make it perform them. It may be made to rotate the fixed direction intermittently, or high-speed rotation and low-speed rotation are repeated, and you may make it make them perform instead of carrying out forward reverse reversal of the liquid container.
[0006] Moreover, by arranging the protection frame 2 which does not let big ice pass through water inside [in which ice and water can be hold] the comparatively big body container 1, the equipment concerning this invention which attains said purpose forms the cold-water room 3 which prevented that it was divided by the protection frame 2 and an icy lump flowed, and makes Himuro 4 parts other than cold-water room 3. While putting water into the interior of the body container 1, ice is put into Himuro 4, and the liquid containers 5, such as canned beer which it is going to cool in the cold-water room 3, are arranged. And either or the both sides of the liquid container 5 arranged in

the cold-water room 3 [redacted]he body container 1 is rotated or r[redacted]ted.
[0007] The tubed protection frame 2 which does not specifically let big ice pass through water inside [in which ice and water are held] the cylinder-like body container 1 is arranged. A way is made into the cold-water room 3 for the space of the protection frame 2 and the wall of the body container 1 among Himuro 4 and a protection frame, it arranges so that the liquid containers 5, such as canned beer, may be supported from the upper part inside the cold-water room 3, and the liquid container 5 supported in the upper part is rotated in the condition of having soaked in the cold-water room 3.
[0008] The cylinder-like body container 1 is laid on the rotation base 6, and you may make it rotate the body container 1 by rotating the rotation base 6 instead of rotating a liquid container 5 in the cold-water room 3. In this case, when the projection 7 of the shape of a rib of a lengthwise direction is formed in the internal surface of the body container 1, Himuro's 4 ice is stirred, water temperature is lowered, and it is effective in raising the cooling effect. Moreover, it is effective in making the flow of water produce turbulence, when the liquid container 5 arranged in the cold-water room 3 is equipped with the cross-sectional deformation attachment 8 or 28, the cross-section configuration was made to deform into the configuration except circular and it rotates, stirring cold water, while preventing that a thermal boundary layer occurs in the cold water near liquid-container 5 front face, and lowering the temperature of water.
[0009] Rotate intermittently the liquid container 5 or the body container 1 which carries out a rotation drive, or high-speed rotation and low-speed rotation are changed intermittently, or forward reverse reversal of the rotation of a fixed include angle within the limits can be carried out, and it can be made to perform. If it does in this way, the cooling effect can be raised by controlling that a thermal boundary layer occurs in the steady flow of a liquid container 5 and water, and making the flow of the cold water near liquid-container 5 front face produce turbulence, and promoting heat transfer.
[0010]
[Embodiment of the Invention] Hereafter, it explains based on the drawing of attachment of the gestalt of operation of the liquid-container cooling system of this invention. Drawing 1 and drawing 2 show an example of the cooling system of this invention, and are the top view drawing 1 was excluding drawing of longitudinal section, and excluding [drawing 2] the lid 11. This operation gestalt forms the cylinder-like body 1 of a container in the interior of a body 9 through a heat insulator 10, arranges the protection frame 2 formed in the shape of a cylinder by the network material of the mesh to which ice does not enter the core of the body 1 of a container, and makes Himuro 3 space between the body container 1 and the protection frame 2 for a way among the protection frames 2 at the cold-water room 3.
[0011] While putting ice into Himuro 4 within the body 1 of a container, the water of the specified quantity is thrown in in the body 1 of a container, the liquid containers 5, such as canned beer which it is going to cool in the cold-water room 3, are located, and a liquid container 5 is cooled with the cold water cooled on ice. The liquid container 5 located in the cold-water room 3 at this time can be cooled comparatively quickly by supporting and carrying out a rotation drive so that it may hang from the upper part.
[0012] In order to support and to carry out the rotation drive of the liquid container 5 so that it may hang from the upper part, it is good to enable it to support a liquid container 5 with the support lever 14 with which the power transfer lever 13 was made to project towards the core of the protection frame 2 horizontally from the motor 12 arranged into the top-plate part of a body 9, and it equipped at the tip. That is, it enables it to hold a liquid container 5 with the maintenance means 15 formed in the lower limit of the support lever 14 while enabling it to carry out the rotation drive of the support lever 14 with which it equipped at the tip of the power transfer lever 13 in the vertical direction by the motor 12 through the power transfer lever 13. Chuck equipment and sucker equipment can be used for the maintenance means 15 formed in the lower limit of the support lever 14. Moreover, if it is made to move in the vertical direction and you enable it to fix in a predetermined location, the support lever 14 is convenient [the power transfer lever 13] for attachment and detachment of a liquid container 5, while making it rotate superficially and enabling it to fix in a predetermined location.
[0013] It is convenient to begin to flow into a cop etc. in comparatively mass canned beer using the teeming machine 16. The operation gestalt shown in drawing 3 connects the teeming machine 16 to

the liquid container 5 he[illegible]in the cold-water room 3 of a coo[illegible] system, and enables it to pour out drinks, such as Biel cooled by operating the cock 18 of the teeming machine 16. That is, the teeming pipe 17 of the teeming machine 16 fixed to the lateral surface of a body 9 is connected to the cap 19 of a liquid container 5. The teeming pipe 17 linked to the cap 19 of a liquid container 5 connects the pressure pipe 21 to cap 19 while a tip connects with the suction pipe 20 which carries out opening to the inner pars basilaris ossis occipitalis of a liquid container 5. It lets the pressure pipe 21 pass, and by sending in high pressure gas in a liquid container 5 with the carbon dioxide cylinder which is not illustrated, with the pressure of high pressure gas, a cock 18 can be operated and drinks, such as Biel, can be poured out from a tap 22.

[0014] The above and the teeming pipe 17 of the teeming machine 16 are good to connect with the cap 19 of a liquid container in the condition that cooling of a liquid container 5 was completed and made it stop. However, if what bends freely like a rubber hose as a teeming pipe 17 is used, and forward reverse reversal of the range of a fixed include angle is carried out for a liquid container 5 and it is made to repeat rotation, it connects with the cap 19 of a liquid container, and the teeming pipe 17 can be poured in by cock 18 actuation of the teeming machine 16 during cooling. At this time, a motor 12 controls rotation by control of a controller 23.

[0015] The cooling system of the operation gestalt which carries out the rotation drive of the body container 1 is shown in drawing 4 and drawing 5 . This operation gestalt establishes the rotation base 6 by which a rotation drive is carried out by the motor 25 in a stand 24, and makes the body container 1 lay on this rotation base 6. That is, by rotating the rotation base 6, will rotate the body container 1, the water and ice in the body container 1 will be made to produce the stirring operation by rotation, and the liquid container arranged in the cold-water room 3 will be cooled effectively.

[0016] As shown in the internal surface of the body container 1 which rotates at drawing 4 and drawing 5 , the rib-like projection 7 is provided in the lengthwise direction. This projection 7 stirs the ice in Himuro 4, lowers the temperature of the water of the cold-water room 3, and makes the cooling effect of a liquid container 5 improve by rotation of the body container 1. When the body 1 of a container continues rotation with constant speed regularly, ice and water of the interior will also rotate in the condition near the rotational speed of the body 1 of a container soon. Therefore, although a liquid container 5 is held in the body of a container and it rotates together with the body 1 of a container, it may hold fixed with the maintenance means 15 shown with a two-dot chain line, or hard flow may be made to rotate a body container, and relative velocity with cold water may be enlarged.

[0017] With the operation gestalt of the cooling system concerning this invention described above, a liquid container 5 is arranged in the cold-water room where an icy invasion was prevented with the protection frame, and since a rate relative between cold water and a liquid container is produced by rotating a liquid container 5 or the body container 1, the cooling effect can be raised according to the stirring operation which controls generating of a thermal boundary layer. If a liquid container continues rotation regularly in water, in the water near [the] the front face, rotation of the same direction as the hand of cut of a liquid container may be produced according to the viscosity, the relative speed difference may decrease, and the depressor effect of thermal-boundary-layer generating and the stirring effectiveness of cold water may decrease.

[0018] this invention persons devised rotating intermittently the liquid container or body container which carries out a rotation drive by the motor as an approach of avoiding reduction of the relative speed difference of the above, a liquid container 5, and the water of the front face. By this, the big speed difference relative between a liquid container 5 and the water of the front face was able to be maintained, and the cooling effect of a liquid container 5 was able to be raised more. How to change high-speed rotation besides the above and intermittent rotation and low-speed rotation intermittently as the rotation approach of maintaining the big speed difference relative between a liquid container 5 and the water of the front face, and the method of carrying out forward reverse reversal of the rotation of the fixed include-angle range, and performing it can be considered. Among these, by the approach of carrying out forward reverse reversal of the rotation of the fixed include-angle range, and performing it, it has the utility which can be used where a liquid container is equipped with a teeming machine.

[0019] Water should just pass as freely as possible the protection frame 2 arranged inside the body 1 of a container, without passing big ice. As the reasonable general structure, although a network basket can be considered, the tube-like object which drilled many holes 26 and 26 as shown in

drawing 6 , and the tube-like object which drilled many slits 2[illegible]and 27 as shown in drawing 7 can also be used as a protection frame 2.

[0020] The liquid container 5 which arranges in a cold-water room and it is made to cool may be a pack container of a square shape besides a cylinder-like can or a bottle. However, when it is going to cool a liquid container with a circular cross-section configuration which is represented by canned beer, a motion of the water in the front face is smooth, and will be in a rectification condition. Therefore, the cooling effect will decrease that it is easy to generate a thermal boundary layer. Then, it devised equipping the liquid container of a circular cross section with a cross-sectional deformation attachment as shown in drawing 9 or drawing 10, making cold water generate turbulence and a turbulent flow, and raising the cooling effect. if the cross-section configuration of a liquid container 5 deforms in addition to circular, a temperature gradient with the cold water with which generating of a thermal boundary layer was controlled more, and liquid-container 5 front face and liquid-container 5 front face are in contact with a stirring operation becomes large, heat exchange is promoted, and the cooling effect of a liquid container 5 will be markedly alike, and will improve.

[0021] The cross-sectional deformation attachment shown in drawing 9 is screwed up with the attachment body 8, and consists of ring 8'. The attachment body 8 makes piece of foot 8b project on all sides of base 8a formed in the shape of a circular ring. While forming depression section 8c to the method of inside in the middle of piece of foot 8b prolonged caudad, 8d of screw sections is formed in the lower limit section. After equipping with this attachment body 8 so that a liquid container 5 may be covered, it is screwed up in 8d of screw sections formed in the lower limit of piece of foot 8b, equips with ring 8', and is made to deform the cross-section configuration of a liquid container 5 compulsorily by screwing up piece of foot 8b. It screws up, and instead of ring 8', arbitration may screw up and piece of foot 8b may be screwed up using metallic ornaments.

[0022] The cross-sectional deformation attachment 8 shown in drawing 9 can be used so that the support lever 14 for carrying out a rotation drive may be equipped with the liquid container 5 which equipped the liquid container 5 beforehand and equipped with the cross-sectional deformation attachment 8. However, as shown in drawing 8 , the cross-sectional deformation attachment 8 is fixed to the point of the support lever 14 which carries out a rotation drive in support of a liquid container 5 from the upper part, and a liquid container can be supported by this cross-sectional deformation attachment 8. In this case, attachment section 8e to the support lever 14 which is a rolling mechanism is formed in the center position of base 8a. For example, when the maintenance means of a liquid container established at the tip of the support lever 14 is a sucker, the adsorption maintenance stabilized when it was the smooth side to which a sucker tends to stick is attained.

[0023] Drawing 10 is the perspective view showing an example of another cross-sectional deformation attachment. The cross-sectional deformation attachment 28 shown in drawing 10 is base 28a which formed the whole by elastic material like a flat spring, and was formed in the shape of a circular ring. It is piece of foot 28b to a four way type. It is made to project and is piece of foot 28b. It has bent towards the method of the inside of slanting. Therefore, if it equips with this deformation attachment 28 from the top face or base of a liquid container 5, it is piece of foot 28b. The drum of a liquid container 5 can be pressed and a liquid container 5 can be made to transform by that elastic thrust.

[0024]

[Effect of the Invention] According to claim 1 thru/or the liquid-container cooling approach of this invention given in three, it can cool extremely in a short time by arranging liquid containers, such as canned beer, in the liquefied heat carrier cooled, repeating forward rotation and inverse rotation, and rotating this liquid container, making it rotate intermittently, or repeating high-speed rotation and low-speed rotation. If the reason rotates liquid containers, such as canned beer, in a liquefied heat carrier first, when a liquid container rotates, generating of a thermal boundary layer will be controlled by the relative velocity of a container front face, a heat carrier, and a container front face and an inner solution, and heat exchange will be efficiently performed with it.

[0025] However, if a liquid container continues rotation regularly, the flow of the direction same in the heat carrier or inner solution on the front face of a liquid container as a liquid container will occur, and a relative rate with a liquid container will decrease. Moreover, the inner solution in which the container internal surface with a large rotational speed got [rotational speed] cold according to an operation of a centrifugal force by becoming large as for the outside with the inner solution of a

liquid container near a container internal surface continues remaining in a container internal surface. Therefore, the temperature of a liquid-container internal surface and the temperature gradient of an inner solution decrease, and heat exchange worsens. If the condition of resulting in change to rotation of a liquid container repeating forward rotation and inverse rotation, and rotating, rotating intermittently, or repeating high-speed rotation and low-speed rotation, to it is made The rotational speed of the inner solution with which the container wall front face got cold becomes smaller than the rotational speed of an internal liquid, in an operation of a centrifugal force, an easy next door and the inner solution itself will be stirred, and exchange of the liquid of a container wall front face and the interior will be cooled efficiently.

[0026] According to the liquid-container cooling system of this invention according to claim 4, the cold-water room where an icy invasion is prevented with a protection frame in the body container into which ice and water are put is formed, and a liquid container is arranged in this cold-water room. Therefore, when equipping with a liquid container, or when exchanging, the situation where ice can flow in and cannot work can be avoided. Moreover, while cold water dies and crosses all over a liquid container, a liquid container can be effectively cooled by rotating a liquid container or a body container in a short time.

[0027] In carrying out invention according to claim 4, a liquid container is supported from the upper part, in order to carry out the rotation drive of this, there is no possibility that a rotation drive may be dipped in water or ice, and it is not necessary according to invention according to claim 5, to give special waterproofing structure.

[0028] Since the body of a container is laid on a rotation base and it was made to rotate the body of a container by rotation of a rotation base, while being able to simplify structure according to this invention according to claim 6, neither water nor ice can be applied to a rolling mechanism, and it can be used in comfort.

[0029] According to invention according to claim 7, in carrying out invention according to claim 6, cooling of the water on ice can be promoted and the cooling effect of a liquid container can be heightened according to a stirring operation of ice.

[0030] According to invention according to claim 8, by making the cross-section configuration for liquids arranged in a cold-water room deform, the relative flow of a liquid container and cold water is made to produce turbulence and a turbulent flow, generating of a thermal boundary layer can be prevented, the temperature gradient of the cold water which touches a liquid-container front face and this according to a stirring operation can be enlarged, and the cooling effect can be heightened.

[0031] According to invention claim 9 thru/or given in 11, the cooling effect of a liquid container can be heightened by rotating or rotating rotation of the body of a container which holds a liquid container or a liquid container in modes other than fixed-speed rotation. That is, when the liquid container is being fixed, a thermal boundary layer is made to the liquid in a liquid container, and heat transfer within a container worsens. On the other hand, if a liquid container is rotated, generating of the thermal boundary layer within a container can be controlled, and the cooling effect can be raised. If rotation is continued for a cylinder-like liquid container with constant speed, as for the liquid near the container wall, the whole liquid in a lifting and a liquid container will rotate rotation according to viscosity, and the rotational speed has early distribution for the outside where a path is larger. A centrifugal force acts on liquid with rotation, the liquid with which it got cold near the container wall remains in the outside in a liquid container, and the temperature gradient near a wall surface becomes small. Since this inclination will become remarkable in the big liquid container of a path, the rotational speed of a liquid container is changed or the improvement in the cooling effect by carrying out intermittent rotation will become more effective in the big liquid container which time amount requires for cooling.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL FIELD

[Field of the Invention] This invention is invention about the equipment which realizes effectively the cooling approach for cooling quickly canned drinks, such as canned beer, and a PET bottle and the liquid container of a drink and others containing a paper pack, and this approach.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

PRIOR ART

[Description of the Prior Art] It is indicated by JP,10-141825,A as equipment for drinking drinks containing a container, such as canned beer, as much as possible for a short time, and cooling to the temperature at the time, What prepares a rotation base into the container containing ice, is made to rotate a drink can directly, and is cooled, and the thing which rotates the drink can which the drink can was made to adsorb, held horizontally and was horizontally held with the sucker prepared in the motor shaft so that it might be indicated by JP,10-141827,A in the container containing ice are known.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

EFFECT OF THE INVENTION

[Effect of the Invention] According to claim 1 thru/or the liquid-container cooling approach of this invention given in three, it can cool extremely in a short time by arranging liquid containers, such as canned beer, in the liquefied heat carrier cooled, repeating forward rotation and inverse rotation, and rotating this liquid container, making it rotate intermittently, or repeating high-speed rotation and low-speed rotation. If the reason rotates liquid containers, such as canned beer, in a liquefied heat carrier first, when a liquid container rotates, generating of a thermal boundary layer will be controlled by the relative velocity of a container front face, a heat carrier, and a container front face and an inner solution, and heat exchange will be efficiently performed with it.
[0025] However, if a liquid container continues rotation regularly, the flow of the direction same in the heat carrier or inner solution on the front face of a liquid container as a liquid container will occur, and a relative rate with a liquid container will decrease. Moreover, the inner solution in which the container internal surface with a large rotational speed got [rotational speed] cold according to an operation of a centrifugal force by becoming large as for the outside with the inner solution of a liquid container near a container internal surface continues remaining in a container internal surface. Therefore, the temperature of a liquid-container internal surface and the temperature gradient of an inner solution decrease, and heat exchange worsens. It is in that a liquid container repeats forward rotation and inverse rotation, and rotates **** to it, When the condition of resulting in change to rotation of rotating intermittently or repeating high-speed rotation and low-speed rotation is made, the rotational speed of the inner solution with which the container wall front face got cold becomes smaller than the rotational speed of an internal liquid, in an operation of a centrifugal force, an easy next door and the inner solution itself will be stirred, and exchange of the liquid of a container wall front face and the interior will be cooled efficiently.
[0026] According to the liquid-container cooling system of this invention according to claim 4, the cold-water room where an icy invasion is prevented with a protection frame in the body container into which ice and water are put is formed, and a liquid container is arranged in this cold-water room. Therefore, when equipping with a liquid container, or when exchanging, the situation where ice can flow in and cannot work can be avoided. Moreover, while cold water dies and crosses all over a liquid container, a liquid container can be effectively cooled by rotating a liquid container or a body container in a short time.
[0027] In carrying out invention according to claim 4, a liquid container is supported from the upper part, in order to carry out the rotation drive of this, there is no possibility that a rotation drive may be dipped in water or ice, and it is not necessary according to invention according to claim 5, to give special waterproofing structure.
[0028] Since the body of a container is laid on a rotation base and it was made to rotate the body of a container by rotation of a rotation base, while being able to simplify structure according to this invention according to claim 6, neither water nor ice can be applied to a rolling mechanism, and it can be used in comfort.
[0029] According to invention according to claim 7, in carrying out invention according to claim 6, cooling of the water on ice can be promoted and the cooling effect of a liquid container can be heightened according to a stirring operation of ice.
[0030] According to invention according to claim 8, by making the cross-section configuration for liquids arranged in a cold-water room deform, the relative flow of a liquid container and cold water is made to produce turbulence and a turbulent flow, generating of a thermal boundary layer can be

prevented, the temperature gradient of the cold water which touches a liquid-container front face and this according to a stirring operation can be enlarged, and the cooling effect can be heightened.

[0031] According to invention claim 9 thru/or given in 11, the cooling effect of a liquid container can be heightened by rotating or rotating rotation of the body of a container which holds a liquid container or a liquid container in modes other than fixed-speed rotation. That is, when the liquid container is being fixed, a thermal boundary layer is made to the liquid in a liquid container, and heat transfer within a container worsens. On the other hand, if a liquid container is rotated, generating of the thermal boundary layer within a container can be controlled, and the cooling effect can be raised. If rotation is continued for a cylinder-like liquid container with constant speed, as for the liquid near the container wall, the whole liquid in a lifting and a liquid container will rotate rotation according to viscosity, and the rotational speed has early distribution for the outside where a path is larger. A centrifugal force acts on liquid with rotation, the liquid with which it got cold near the container wall remains in the outside in a liquid container, and the temperature gradient near a wall surface becomes small. Since this inclination will become remarkable in the big liquid container of a path, the rotational speed of a liquid container is changed or the improvement in the cooling effect by carrying out intermittent rotation will become more effective in the big liquid container which time amount requires for cooling.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Since each of above and conventional cooling systems was the things equipped with liquid containers, such as a can which it is going to cool to the space where ice or ice, and water are intermingled, they had the fault of ice becoming obstructive and being hard to equip when equipping with a liquid container, and the fault that rotation of a can etc. was checked on ice. Moreover, the revolving shaft of a motor may be damp for any cooling system indicated by JP,10-141825,A and JP,10-141827,A. Therefore, the motor shaft needed to be made into positive seal structure.
[0004] This invention aims at offering the cooling approach and equipment which can cool a liquid container as more quickly [than the conventional thing] as possible while ice does not become obstructive but it offers a cooling system convenient handling in view of the fault of the above-mentioned conventional technique, when equipping with a liquid container. Usually for cooling especially canned beer, such as a liquid container, 2l. which is large capacity comparatively, and 3l., to temperature at the drinker time, long duration is required. When such, it enables it to cool this invention for a short time of 5 - 15 minutes. Furthermore, it shall be made not damp [a revolving shaft] in water, and the seal device of a motor shaft shall be omitted.

[Translation done.]

MEANS

[Means for Solving the Problem] As an approach for attaining the above-mentioned purpose, this invention arranges a liquid container in the liquefied heat carrier cooled, and cools a liquid container by rotating this liquid container. Furthermore, the liquid container to rotate repeats forward rotation and inverse rotation, and it is made to make it perform them. It may be made to rotate the fixed direction intermittently, or high-speed rotation and low-speed rotation are repeated, and you may make it make them perform instead of carrying out forward reverse reversal of the liquid container.
[0006] Moreover, by arranging the protection frame 2 which does not let big ice pass through water inside [in which ice and water can be hold] the comparatively big body container 1, the equipment concerning this invention which attains said purpose forms the cold-water room 3 which prevented that it was divided by the protection frame 2 and an icy lump flowed, and makes Himuro 4 parts other than cold-water room 3. While putting water into the interior of the body container 1, ice is put into Himuro 4, and the liquid containers 5, such as canned beer which it is going to cool in the cold-water room 3, are arranged. And either or the both sides of the liquid container 5 arranged in the cold-water room 3 or the body container 1 is rotated or rotated.
[0007] The tubed protection frame 2 which does not specifically let big ice pass through water inside [in which ice and water are held] the cylinder-like body container 1 is arranged. A way is made into the cold-water room 3 for the space of the protection frame 2 and the wall of the body container 1 among Himuro 4 and a protection frame, it arranges so that the liquid containers 5, such as canned beer, may be supported from the upper part inside the cold-water room 3, and the liquid container 5 supported in the upper part is rotated in the condition of having soaked in the cold-water room 3.
[0008] The cylinder-like body container 1 is laid on the rotation base 6, and you may make it rotate the body container 1 by rotating the rotation base 6 instead of rotating a liquid container 5 in the cold-water room 3. In this case, when the projection 7 of the shape of a rib of a lengthwise direction is formed in the internal surface of the body container 1, Himuro's 4 ice is stirred, water temperature is lowered, and it is effective in raising the cooling effect. Moreover, it is effective in making the flow of water produce turbulence, when the liquid container 5 arranged in the cold-water room 3 is equipped with the cross-sectional deformation attachment 8 or 28, the cross-section configuration was made to deform into the configuration except circular and it rotates, stirring cold water, while preventing that a thermal boundary layer occurs in the cold water near liquid-container 5 front face, and lowering the temperature of water.
[0009] Rotate intermittently the liquid container 5 or the body container 1 which carries out a rotation drive, or high-speed rotation and low-speed rotation are changed intermittently, or forward reverse reversal of the rotation of a fixed include angle within the limits can be carried out, and it can be made to perform. If it does in this way, the cooling effect can be raised by controlling that a thermal boundary layer occurs in the steady flow of a liquid container 5 and water, and making the flow of the cold water near liquid-container 5 front face produce turbulence, and promoting heat transfer.
[0010]
[Embodiment of the Invention] Hereafter, it explains based on the drawing of attachment of the gestalt of operation of the liquid-container cooling system of this invention. Drawing 1 and drawing 2 show an example of the cooling system of this invention, and are the top view drawing 1 was excluding drawing of longitudinal section, and excluding [drawing 2] the lid 11. This operation

gestalt forms the cylinder-like body 1 of a container in the interior of a body 9 through a heat insulator 10, arranges the protection frame 2 formed in the shape of a cylinder by the network material of the mesh to which ice does not enter the core of the body 1 of a container, and makes Himuro 3 space between the body container 1 and the protection frame 2 for a way among the protection frames 2 at the cold-water room 3.

[0011] While putting ice into Himuro 4 within the body 1 of a container, the water of the specified quantity is thrown in in the body 1 of a container, the liquid containers 5, such as canned beer which it is going to cool in the cold-water room 3, are located, and a liquid container 5 is cooled with the cold water cooled on ice. The liquid container 5 located in the cold-water room 3 at this time can be cooled comparatively quickly by supporting and carrying out a rotation drive so that it may hang from the upper part.

[0012] In order to support and to carry out the rotation drive of the liquid container 5 so that it may hang from the upper part, it is good to enable it to support a liquid container 5 with the support lever 14 with which the power transfer lever 13 was made to project towards the core of the protection frame 2 horizontally from the motor 12 arranged into the top-plate part of a body 9, and it equipped at the tip. That is, it enables it to hold a liquid container 5 with the maintenance means 15 formed in the lower limit of the support lever 14 while enabling it to carry out the rotation drive of the support lever 14 with which it equipped at the tip of the power transfer lever 13 in the vertical direction by the motor 12 through the power transfer lever 13. Chuck equipment and sucker equipment can be used for the maintenance means 15 formed in the lower limit of the support lever 14. Moreover, if it is made to move in the vertical direction and you enable it to fix in a predetermined location, the support lever 14 is convenient [the power transfer lever 13] for attachment and detachment of a liquid container 5, while making it rotate superficially and enabling it to fix in a predetermined location.

[0013] It is convenient to begin to flow into a cop etc. in comparatively mass canned beer using the teeming machine 16. The operation gestalt shown in drawing 3 connects the teeming machine 16 to the liquid container 5 held in the cold-water room 3 of a cooling system, and enables it to pour out drinks, such as Biel cooled by operating the cock 18 of the teeming machine 16. That is, the teeming pipe 17 of the teeming machine 16 fixed to the lateral surface of a body 9 is connected to the cap 19 of a liquid container 5. The teeming pipe 17 linked to the cap 19 of a liquid container 5 connects the pressure pipe 21 to cap 19 while a tip connects with the suction pipe 20 which carries out opening to the inner pars basilaris ossis occipitalis of a liquid container 5. It lets the pressure pipe 21 pass, and by sending in high pressure gas in a liquid container 5 with the carbon dioxide cylinder which is not illustrated, with the pressure of high pressure gas, a cock 18 can be operated and drinks, such as Biel, can be poured out from a tap 22.

[0014] The above and the teeming pipe 17 of the teeming machine 16 are good to connect with the cap 19 of a liquid container in the condition that cooling of a liquid container 5 was completed and made it stop. However, if what bends freely like a rubber hose as a teeming pipe 17 is used, and forward reverse reversal of the range of a fixed include angle is carried out for a liquid container 5 and it is made to repeat rotation, it connects with the cap 19 of a liquid container, and the teeming pipe 17 can be poured in by cock 18 actuation of the teeming machine 16 during cooling. At this time, a motor 12 controls rotation by control of a controller 23.

[0015] The cooling system of the operation gestalt which carries out the rotation drive of the body container 1 is shown in drawing 4 and drawing 5 . This operation gestalt establishes the rotation base 6 by which a rotation drive is carried out by the motor 25 in a stand 24, and makes the body container 1 lay on this rotation base 6. That is, by rotating the rotation base 6, will rotate the body container 1, the water and ice in the body container 1 will be made to produce the stirring operation by rotation, and the liquid container arranged in the cold-water room 3 will be cooled effectively.

[0016] As shown in the internal surface of the body container 1 which rotates at drawing 4 and drawing 5 , the rib-like projection 7 is provided in the lengthwise direction. This projection 7 stirs the ice in Himuro 4, lowers the temperature of the water of the cold-water room 3, and makes the cooling effect of a liquid container 5 improve by rotation of the body container 1. When the body 1 of a container continues rotation with constant speed regularly, ice and water of the interior will also rotate in the condition near the rotational speed of the body 1 of a container soon. Therefore, although a liquid container 5 is held in the body of a container and it rotates together with the body 1 of a container, it may hold fixed with the maintenance means 15 shown with a two-dot chain line,

or hard flow may be made to rotate a body container, and relative velocity with cold water may be enlarged.

[0017] With the operation gestalt of the cooling system concerning this invention described above, a liquid container 5 is arranged in the cold-water room where an icy invasion was prevented with the protection frame, and since a rate relative between cold water and a liquid container is produced by rotating a liquid container 5 or the body container 1, the cooling effect can be raised according to the stirring operation which controls generating of a thermal boundary layer. If a liquid container continues rotation regularly in water, in the water near [the] the front face, rotation of the same direction as the hand of cut of a liquid container may be produced according to the viscosity, the relative speed difference may decrease, and the depressor effect of thermal-boundary-layer generating and the stirring effectiveness of cold water may decrease.

[0018] this invention persons devised rotating intermittently the liquid container or body container which carries out a rotation drive by the motor as an approach of avoiding reduction of the relative speed difference of the above, a liquid container 5, and the water of the front face. By this, the big speed difference relative between a liquid container 5 and the water of the front face was able to be maintained, and the cooling effect of a liquid container 5 was able to be raised more. How to change high-speed rotation besides the above and intermittent rotation and low-speed rotation intermittently as the rotation approach of maintaining the big speed difference relative between a liquid container 5 and the water of the front face, and the method of carrying out forward reverse reversal of the rotation of the fixed include-angle range, and performing it can be considered. Among these, by the approach of carrying out forward reverse reversal of the rotation of the fixed include-angle range, and performing it, it has the utility which can be used where a liquid container is equipped with a teeming machine.

[0019] Water should just pass as freely as possible the protection frame 2 arranged inside the body 1 of a container, without passing big ice. As the reasonable general structure, although a network basket can be considered, the tube-like object which drilled many holes 26 and 26 as shown in drawing 6 , and the tube-like object which drilled many slits 27 and 27 as shown in drawing 7 can also be used as a protection frame 2.

[0020] The liquid container 5 which arranges in a cold-water room and it is made to cool may be a pack container of a square shape besides a cylinder-like can or a bottle. However, when it is going to cool a liquid container with a circular cross-section configuration which is represented by canned beer, a motion of the water in the front face is smooth, and will be in a rectification condition. Therefore, the cooling effect will decrease that it is easy to generate a thermal boundary layer. Then, it devised equipping the liquid container of a circular cross section with a cross-sectional deformation attachment as shown in drawing 9 or drawing 10, making cold water generate turbulence and a turbulent flow, and raising the cooling effect. if the cross-section configuration of a liquid container 5 deforms in addition to circular, a temperature gradient with the cold water with which generating of a thermal boundary layer was controlled more, and liquid-container 5 front face and liquid-container 5 front face are in contact with a stirring operation becomes large, heat exchange is promoted, and the cooling effect of a liquid container 5 will be markedly alike, and will improve.

[0021] The cross-sectional deformation attachment shown in drawing 9 is screwed up with the attachment body 8, and consists of ring 8'. The attachment body 8 makes piece of foot 8b project on all sides of base 8a formed in the shape of a circular ring. While forming depression section 8c to the method of inside in the middle of piece of foot 8b prolonged caudad, 8d of screw sections is formed in the lower limit section. After equipping with this attachment body 8 so that a liquid container 5 may be covered, it is screwed up in 8d of screw sections formed in the lower limit of piece of foot 8b, equips with ring 8', and is made to deform the cross-section configuration of a liquid container 5 compulsorily by screwing up piece of foot 8b. It screws up, and instead of ring 8', arbitration may screw up and piece of foot 8b may be screwed up using metallic ornaments.

[0022] The cross-sectional deformation attachment 8 shown in drawing 9 can be used so that the support lever 14 for carrying out a rotation drive may be equipped with the liquid container 5 which equipped the liquid container 5 beforehand and equipped with the cross-sectional deformation attachment 8. However, as shown in drawing 8 , the cross-sectional deformation attachment 8 is fixed to the point of the support lever 14 which carries out a rotation drive in support of a liquid container 5 from the upper part, and a liquid container can be supported by this cross-sectional

deformation attachment 8. In this case, attachment section 8e to the support lever 14 which is a rolling mechanism is formed in the center position of base 8a. For example, when the maintenance means of a liquid container established at the tip of the support lever 14 is a sucker, the adsorption maintenance stabilized when it was the smooth side to which a sucker tends to stick is attained.

[0023] Drawing 10 is the perspective view showing an example of another cross-sectional deformation attachment. The cross-sectional deformation attachment 28 shown in drawing 10 is base 28a which formed the whole by elastic material like a flat spring, and was formed in the shape of a circular ring. It is piece of foot 28b to a four way type. It is made to project and is piece of foot 28b. It has bent towards the method of the inside of slanting. Therefore, if it equips with this deformation attachment 28 from the top face or base of a liquid container 5, it is piece of foot 28b. The drum of a liquid container 5 can be pressed and a liquid container 5 can be made to transform by that elastic thrust.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing of longitudinal section showing an example of the cooling system of this invention,
[Drawing 2] The top view except the lid of the cooling system of drawing 1 ,
[Drawing 3] Drawing of longitudinal section of the whole cooling system in which an example of the cooling system equipped with the teeming machine of the liquid in a liquid container is shown,
[Drawing 4] Drawing of longitudinal section showing an example of the cooling system of another operation gestalt of this invention,
[Drawing 5] The length-and-breadth sectional view of the cooling system of drawing 4 ,
[Drawing 6] The perspective view showing an example of the protection frame arranged inside the body of a container,
[Drawing 7] The perspective view showing another example of the protection frame arranged inside the body of a container,
[Drawing 8] Drawing of longitudinal section of the whole cooling system of the operation gestalt which equips with and uses a cross-sectional deformation attachment,
[Drawing 9] The decomposition perspective view of the cross-sectional deformation attachment used for the cooling system of drawing 8 ,
[Drawing 10] The perspective view showing the modification of a cross-sectional deformation attachment.
[Description of Notations]
1 -- Body container 2 -- Protection frame 3 -- Cold-water room 4 -- Himuro 5 -- Liquid container, 6 -- Rotation base 7 -- Projection 8 28 -- Cross-sectional deformation attachment, 8' -- It screws up and is a ring. 8a -- Base 8b -- Piece of a foot 8c -- Depression section, 8d -- Screw section 8e [10 -- Heat insulating material,] -- The attachment section, 9 -- Body 11 -- Lid 12 -- Motor 13 -- Power transfer lever 14 -- Support lever, 15 -- Maintenance means 16 -- Teeming machine 17 -- Teeming pipe 18 -- Cock, 19 -- Cap 20 -- Suction pipe 21 -- Pressure pipe 22 -- Tap 23 -- Controller 24 -- Stand 25 -- Actuation motor 26 -- Hole 27 -- Slit.

[Translation done.]

[첨부그림 1]

(19)日本国特許庁（JP）　(12)公開特許公報（A）　(11)特許出願公開番号
特開2002－13855
（P2002－13855A）
(43)公開日　平成14年1月18日(2002.1.18)

(51)Int.Cl.'	識別記号	FI		テーマコード'(参考)
F25D 3/08		F25D 3/08		A 3E082
B67D 1/08		B67D 1/08		A 3L044

審査請求 未請求 請求項の数11 OL （全 7 頁）

(21)出願番号　特願2000－192814(P2000－192814)

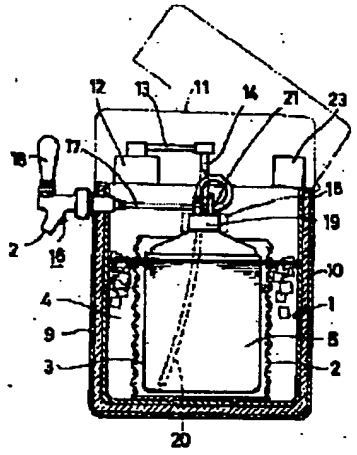
(22)出願日　平成12年6月27日(2000.6.27)

(71)出願人　000092473
象印マホービン株式会社
大阪府大阪市北区天満１丁目20番５号
(72)発明者　高堀　豊彦
大阪府大阪市北区天満１丁目20番５号象印マホービン株式会社内
(72)発明者　岡川　一信
大阪府大阪市北区天満１丁目20番５号象印マホービン株式会社内
(74)代理人　100103854
弁理士　鎌田　光宜　（外１名）

Fターム(参考)　3E082 BB03 CC01 EE02 FF08
3L044 AA04 BA03 CA05 BC01 FA01
KA04

(54)【発明の名称】　液体容器冷却方法及び装置

(57)【要約】
【課題】氷を使って比較的大容量の缶ビールなどを、できるだけ短時間に飲み頃温度に冷却することができる冷却装置を実現することを目的とする。
【解決手段】本体容器１の内部に水を通し大きな氷を通さない網かごなどの保護体２を配置し、保護体の内方を冷水室３外方を氷室４とし、この氷室４に氷を投入するとともに容器本体１内に所定量の水を投入する。保護体２内方の冷水室３に缶ビールなどの液体容器５を上方から支持するように配置し、上方から支持する液体容器５を回転又は回動させる。これにより、本体容器１を移動したり取り替えるときに氷が邪魔にならず、しかも短時間で冷却することができる。



[첨부그림 2]

【特許請求の範囲】

【請求項１】冷却される液状の熱媒体中に液体容器を配置し、該液体容器を回転させることによって液体容器を冷却する方法において、前記液体容器の回転が正回転と逆回転の繰り返しであることを特徴とする液体容器冷却方法。

【請求項２】冷却される液状の熱媒体中に液体容器を配置し、該液体容器を回転させることによって液体容器を冷却する方法において、前記液体容器の回転が間歇的な回転駆動であることを特徴とする液体容器冷却方法。

【請求項３】冷却される液状の熱媒体中に液体容器を配置し、該液体容器を回転させることによって液体容器を冷却する方法において、前記液体容器の回転が高速と低速の繰り返しであることを特徴とする液体容器冷却方法。

【請求項４】氷と水を収容する本体容器の内部に水を通し大きな氷を通さない保護枠を配置し、該保護枠によって氷の回まりの流入が阻止された冷水室を形成し、該冷水室に缶ビールなどの液体容器を配置するとともに、冷水室に配置する液体容器もしくは本体容器のいずれか一方もしくは双方を回転又は回動させることを特徴とする液体容器冷却装置。

【請求項５】氷と水を収容する円筒状の本体容器の内部に、水を通し大きな氷を通さない筒状の保護枠を配置し、該保護枠と本体容器内壁との空間を氷室、保護枠の内方を冷水室とし、冷水室の内部に缶ビールなどの液体容器を上方から支持することく配置し、該上方で支持した液体容器を冷水室の内部で回転又は回動させることを特徴とする液体容器冷却装置。

【請求項６】氷と水を収容する円筒状の本体容器を回転台の上に載置し、該回転台の上に載置した本体容器の内部に水を通し大きな氷を通さない筒状の保護枠を配置し、該保護枠と本体容器内壁との空間を氷室、保護枠の内方を冷水室とし冷水室の内部に缶ビールなどの液体容器を収容し、回転台の回転によって本体容器を回転又は回動させることを特徴とする液体容器冷却装置。

【請求項７】本体容器の内壁面に縦方向のリブ状の突起物を形成したことを特徴とする請求項６に記載の液体容器冷却装置。

【請求項８】冷水室に配置する液体容器に断面変形アタッチメントを装着して断面形状を円形以外の形状に変形させることを特徴とする請求項４ないし７のいずれかに記載の液体容器冷却装置。

【請求項９】本体容器及び／又は液体容器を、間歇的に回転させることを特徴とする請求項４ないし８のいずれかに記載の液体容器冷却装置。

【請求項１０】本体容器及び／又は液体容器の回転速度を、回転運動中に高速回転と低速回転の変更を順次的に行うことを特徴とする請求項４ないし８のいずれかに記載の液体容器冷却装置。

【請求項１１】本体容器及び／又は液体容器は一定角度の範囲内の回動を正逆反転させて行うことを特徴とする請求項４ないし８のいずれかに記載の液体容器冷却装置。

【０００１】

【発明の属する技術分野】本発明は、缶ビールなどの缶入りの飲料、ペットボトルや紙パック入りの飲料その他の液体容器を迅速に冷却するための冷却方法及びこの方法を効果的に実現する装置に関する発明である。

【０００２】

【従来の技術】缶ビールなどの容器入りの飲料をできるだけ短時間で飲み頃の温度に冷却するための装置として、特開平１０－１４１８２５号に開示されるように、氷の入った容器の中に回転台を設けて飲料缶を直接回転させて冷却するものや、特開平１０－１４１８２７号に開示されるように、モータ軸に設けた吸盤で飲料缶を吸着させて水平方向に保持し、水平方向に保持した飲料缶を氷の入った容器の中で回転させるものが知られている。

【０００３】

【発明が解決しようとする課題】上記、従来の冷却装置はいずれも氷、もしくは氷と水の混在する空間に冷却しようとする缶などの液体容器を装着するものであったため、液体容器を装着する場合に氷が邪魔になって装着しにくいという欠点と、氷によって缶などの回転が阻害されるという欠点があった。また、特開平１０－１４１８２５号及び特開平１０－１４１８２７号に開示されるいずれの冷却装置も、モータの回転軸が濡れる可能性がある。そのため、モータ軸を複雑なシール構造としておく必要があった。

【０００４】本発明は、上記従来技術の欠点に鑑み、液体容器を装着する場合に氷が邪魔にならず取り扱いに便利な冷却装置を提供するとともに、従来のものよりもできるだけ迅速に液体容器を冷却することができる冷却方法及び装置を提供することを目的とするものである。液体容器、特に比較的大容量である２リットル、３リットルといった缶ビールを飲み頃温度に冷却するには長時間を要するのが普通である。本発明は、このような場合に例えば５～１５分といった短時間に冷却することができるようにする。さらに、回転軸が水に濡れないようにし、モータ軸のシール機構を省略することができるものとする。

【０００５】

【課題を解決するための手段】上記目的を達成するための方法として本発明は、冷却される液状の熱媒体中に液体容器を配置し、この液体容器を回転させることによって液体容器を冷却する。さらに、回転させる液体容器は、正回転と逆回転を繰り返し行わせるようにする。液体容器を正逆反転させる代わりに、一定方向の回転を間

[첨부그림 3]

散的に行わせるようにしたり、高速回転と低速回転を繰り返し行わせるようにしてもよい。

【０００６】また、前記目的を達成する本発明に係る装置は、氷と水を収容することができる比較的大きな本体容器１の内部に、水を通し大きな氷を通さない保護枠２を配置することによって保護枠２で区画され氷の固まりが流入するのを阻止した冷水室３を形成し、冷水室３以外の部分を氷室４とする。本体容器１の内部に水を入れるとともに氷室４に氷を入れ、冷水室３内に冷却しようとする缶ビールなどの液体容器５を配置する。そして、冷水室３に配置する液体容器５もしくは本体容器１のいずれか一方もしくは双方を回転又は回動させる。

【０００７】具体的には、氷と水を収容する円筒状の本体容器１の内部に、水を通し大きな氷を通さない筒状の保護枠２を配置する。保護枠２と本体容器１の内壁との空間を氷室４、保護枠の内方を冷水室３とし、冷水室３の内部に缶ビールなどの液体容器５を上方から支持することく配置し、上方で支持した液体容器５を冷水室３に浸けた状態で回転させる。

【０００８】冷水室３の中で液体容器５を回転させる代わりに、円筒状の本体容器１を回転台６の上に載置し、回転台６を回転させることによって本体容器１を回転させるようにしてもよい。この場合、本体容器１の内壁面に縦方向のリブ状の突起物７を形成しておくと、氷室４の氷が攪拌されて氷温を下げ、冷却効果を向上させる効果がある。また、冷水室３に配置する液体容器５に断面変形アタッチメント８や29を装着して断面形状を円形以外の形状に変形させると回転したときに水の流れに乱れを生じさせ、液体容器５表面付近の冷水に温度境界層が発生するのを防止するとともに、冷水を攪拌し水の温度を下げる効果がある。

【０００９】回転駆動する液体容器５又は本体容器１を間歇的に回転させたり、高速回転と低速回転の変更を断続的に行ったり、一定角度の範囲内の回動を正逆反転させて行なわせることができる。このようにすると、液体容器５と水との定常的な流れの中で温度境界層が発生するのを抑制し、また液体容器５表面付近の冷水の流れに乱れを生ぜしめ熱伝達を促進することによって冷却効果を向上させることができる。

【００１０】

【発明の実施の形態】以下、本発明の液体容器冷却装置の実施の形態を添付の図面に基づいて説明する。図１、図２は、本発明の冷却装置の一例を示すもので、図１は縦断面図、図２は蓋11を除いた平面図である。この実施形態は本体９の内部に断熱材10を介して円筒状の容器本体１を設け、容器本体１の中心部に氷が入り込まない網目の鋼材で円筒状に形成した保護枠２を配置し、保護枠２の内方を冷水室３に、本体容器１と保護枠２の間の空間を氷室３としたものである。

【００１１】容器本体１内の氷室４に氷を入れるとともに、容器本体１内に所定量の水を投入し、冷水室３内に冷却しようとする缶ビールなどの液体容器５を位置させ、氷によって冷やされた冷水で液体容器５を冷却するものである。このとき冷水室３に位置させる液体容器５は、上方から吊るすように支持し、回転駆動することによって比較的迅速に冷却することができる。

【００１２】液体容器５を、上方から吊るすように支持し回転駆動させるには、本体９の天板部分に配置したモータ12から水平方向に保護枠２の中心部に向けて動力伝達杆13を突出させ、その先端に装着した支持杆14によって液体容器５を支持することができるようにするとよい。すなわち、動力伝達杆13の先端に上下方向に装着した支持杆14は、動力伝達杆13を介してモータ12によって回転駆動することができるようにするとともに、支持杆14の下端に設けた保持手段15によって液体容器５を保持することができるようにする。支持杆14の下端に設ける保持手段15には、チャック装置や吸着装置を利用することができる。また、動力伝達杆13は平面的に回動させ所定位置で固定することができるようにするとともに、支持杆14は上下方向に移動させ所定位置で固定することができるようにしておくと液体容器５の着脱に便利である。

【００１３】比較的大容量の缶ビールでは、注出器16を利用してコップなどに注ぎ出すのが便利である。図３に示す実施形態は、冷却装置の冷水室３に収容した液体容器５に注出器16を接続し、注出器16のコック18を操作することによって冷却されたビールなどの飲料を注出することができるようにしている。すなわち、本体９の外側面に固定した注出器16の注出パイプ17を液体容器５のキャップ19に接続している。液体容器５のキャップ19に接続した注出パイプ17は、先端が液体容器５の内底部に開口する吸引パイプ20に接続するとともに、キャップ19には圧力パイプ21を接続する。圧力パイプ21を通して、図示していない炭酸ガスボンベによって高圧ガスを液体容器５内に送り込むことによって、高圧ガスの圧力によってコック18を操作して注ぎ口22からビールなどの飲料を注出することができる。

【００１４】前記、注出器16の注出パイプ17は、液体容器５の冷却が完了して停止させた状態で液体容器のキャップ19に接続するとよい。しかしながら、注出パイプ17としてゴムホースのように自由に撓むものを使用し、かつ液体容器５を一定角度の範囲を正逆反転させて回動を繰り返すようにすると、注出パイプ17を液体容器のキャップ19に接続しておき、冷却中においても注出器16のコック18操作によって注湯することができる。このとき、モータ12は制御器29の制御によって回動を制御する。

【００１５】図４及び図５には、本体容器１を回転駆動させる実施形態の冷却装置を示している。この実施形態は、架台24にモータ25によって回転駆動される回転台６を設け、この回転台６の上に本体容器１を載置させたも

[첨부그림 4]

のである。すなわち、回転台６を回転することによって本体容器１を回転し、本体容器１内の水と氷に回転による撹拌作用を生じさせ、冷水室３内に配置した液体容器を効果的に冷却することになる。

【００１６】回転運動をする本体容器１の内壁面には、図４、図５に示すように縦方向にリブ状の突起物７を設けている。この実施例７は、本体容器１の回転によって氷室４内の氷を撹拌し、冷水室３の水の温度を下げて液体容器５の冷却効果を向上させることになる。容器本体１が定常的に一定速度で回転を続けると、その内部の氷や水もやがて容器本体１の回転速度に近い状態で回転することになる。したがって、液体容器５は容器本体内に収容され、容器本体１と一緒に回転するものであってもよいが、二点鎖線で示す保持手段15によって固定的に保持し、あるいは本体容器とは逆方向に回転させ冷水との相対速度を大きくするものであってもよい。

【００１７】以上述べた本発明に係る冷却装置の実施形態では、保護枠によって氷の侵入が阻止された冷水室の中に液体容器５を配置し、液体容器５もしくは本体容器１を回転させることによって冷水と液体容器の間に相対的な速度を生じさせるため、温度境界層の発生を抑制する撹拌作用によって冷却効果を向上させることができるものである。水の中で液体容器が定常的に回転を続けると、その表面近くの水にはその粘性によって液体容器の回転方向と同じ方向の回転を生じ、相対的な速度差が減少して温度境界層発生の抑制効果や冷水の撹拌効果が減少する可能性がある。

【００１８】上記、液体容器５とその表面の水との相対的な速度差の減少を回避する方法として、本発明者らはモータによって回転駆動する液体容器もしくは本体容器を間歇的に回転させることを工夫した。これによって、液体容器５とその表面の水との間に相対的な大きな速度差を維持し、液体容器５の冷却効果をより向上させることができた。液体容器５とその表面の水との間に相対的な大きな速度差を維持する回転方法として、上記、間歇的な回転のほか、高速回転と低速回転の変更を断続的に行う方法や、一定角度範囲の回動を正逆反転させて行う方法が考えられる。このうち、一定角度範囲の回動を正逆反転させて行う方法では、液体容器に注出器を装着した状態で使用することができる実益を有する。

【００１９】容器本体１の内部に配置する保護枠２は、大きな氷を通過させずに水ができるだけ自由に通過するものであればよい。そのもっとも一般的な構造として、網カゴが考えられるが、図６に示すように多数の孔26，26を穿設した筒状体や、図７に示すように多数のスリット27，27を穿設した筒状体を保護枠２として使用することもできる。

【００２０】冷水室に配置して冷却させる液体容器５は、円筒状の缶やボトルの他、角形のパック容器であってもよい。しかしながら、缶ビールに代表されるような断面形状が円形である液体容器を冷却しようとするときは、その表面における水の動きがなめらかで整流状態となる。そのため、温度境界層が発生し易く冷却効果が減少することになる。そこで、図９や図10に示すような断面変形アタッチメントを円形断面の液体容器に装着し、冷水に乱れ、乱流を発生させて冷却効果を向上させることを工夫した。液体容器５の断面形状が円形以外に変形されると、温度境界層の発生がより抑制され、かつ撹拌作用によって液体容器５表面と液体容器５表面が接している冷水との温度差が大きくなり熱交換が促進され、液体容器５の冷却効果が格段に向上する。

【００２１】図９に示す断面変形アタッチメントは、アタッチメント本体８と、締め上げ環8'とで構成している。アタッチメント本体８は、円環状に形成した基部8aの四方に脚片8bを突出させたものである。下方に延びる脚片8bの途中には内方への凹み部8cを形成するとともに、下端部にネジ部8dを形成している。この、アタッチメント本体８は、液体容器５に被せるように装着した後、脚片8bの下端に形成したネジ部8dに締め上げ環8'を装着し、脚片8bを締め上げることによって強制的に液体容器５の断面形状を変形させるものである。締め上げ環8'の代わりに、任意の締め上げ金具を用いて脚片8bを締め上げるものであってもよい。

【００２２】図９に示す断面変形アタッチメント８は、予め液体容器５に装着し、断面変形アタッチメント８を装着した液体容器５を回転駆動するための支持杆14に装着するように使用することができる。しかしながら、図８に示すように液体容器５を上方から支持して回転駆動させる支持杆14の先端部に断面変形アタッチメント８を固定しておき、この断面変形アタッチメント８によって液体容器を支持するようにすることもできる。この場合、基部8aの中心位置に回転維持である支持杆14への取付部8eを形成しておく。例えば、支持杆14の先端に設けた液体容器の保持手段が吸盤である場合、吸盤が吸着し易い平滑面としておくと安定した吸着保持が可能となる。

【００２３】図10は別の断面変形アタッチメントの一例を示す斜視図である。　図10に示す断面変形アタッチメント28は、全体を板バネのような弾性材で形成したものであって、円環状に形成した基部28a の四方に脚片28b を突出させ、脚片28b を斜め内方へ向けて折曲している。したがって、この変形アタッチメント28を液体容器５の上面もしくは底面から装着すると、脚片28b が液体容器５の胴を押圧しその弾性的な押圧力によって液体容器５を変形させることができる。

【００２４】

【発明の効果】請求項１ないし３記載の本発明の液体容器冷却方法によれば、冷却される流状の熱媒体中に缶ビールなどの液体容器を配置し、この液体容器を正回転と逆回転とを繰り返して回転させたり、間歇的に回転させ

[첨부그림 5]

たり高速回転と低速回転を繰り返すことによって、極めて短時間で冷却することができる。その理由は、まず液状の熱媒体中において缶ビールなどの液体容器を回転させると、液体容器が回転することによって容器表面と熱媒体及び容器表面と内容液との相対速度によって温度境界層の発生が抑制され、効率良く熱交換が行われる。

【００２５】ところが、液体容器が定常的に回転を継続すると、液体容器表面の熱媒体あるいは内容液に液体容器と同じ方向の流れが発生し液体容器との相対的な速度が減少する。また、液体容器の内容液は、容器内表面に近い外側ほど回転速度が大きくなり、遠心力の作用によって回転速度の大きい容器内表面の冷えた内容液が容器内表面にとどまり続ける。したがって、液体容器内表面の温度と内容液の温度差が少なくなり、熱交換が悪くなる。それに対して、液体容器が正回転と逆回転とを繰り返して回転したり、間歇的に回転したり、高速回転と低速回転を繰り返すというような回転に変化をもたらす状態をつくり出すと、容器内壁表面の冷えた内容液の回転速度が、内部の液体の回転速度より小さくなり、遠心力の作用で容器内壁表面と内部の液体の交換が盛んとなりと内容液そのものが撹拌され効率良く冷やされることになる。

【００２６】請求項４記載の本発明の液体容器冷却装置によれば、氷と水を入れる本体容器の中に保護枠によって氷の侵入が阻止される冷水室を形成し、この冷水室に液体容器を配置させる。そのため、液体容器を装着する場合や取り替える場合に氷が流れ込んで作業できないという事態を回避することができる。また、液体容器の全面に冷水がゆきわたるとともに液体容器もしくは本体容器を回転させることによって、液体容器を効果的に短時間で冷却することができる。

【００２７】請求項５記載の発明によれば、請求項４記載の発明を実施するにあたり、液体容器を上方から支持し、これを回転駆動するため回転駆動機構が水や氷に浸される虞がなく、特別な防水構造を施す必要がない。

【００２８】請求項６記載の本発明によれば、回転台の上に容器本体を載置し回転台の回転によって容器本体を回転させるようにしたため構造を簡略化することができるとともに、回転機構に水や氷が掛かることがなく安心して使用することができるものとなる。

【００２９】請求項７記載の発明によれば、請求項６記載の発明を実施するにあたり、氷の撹拌作用によって氷による水の冷却を促進し、液体容器の冷却効果を高めることができる。

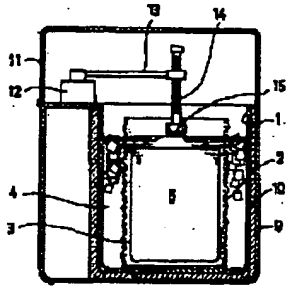
【００３０】請求項８記載の発明によれば、冷水室に配置させる液体用の断面形状を変形させることにより、液体容器と冷水の相対的な流れに乱れ、乱流を生ぜしめ温度境界層の発生を阻止し、撹拌作用によって液体容器表面とこれに接する冷水の温度差を大きくさせ冷却効果を高めることができる。

【００３１】請求項９ないし１１記載の発明によれば、液体容器もしくは液体容器を収容する容器本体の回転を、定速回転以外の態様で回転又は回動させることによって液体容器の冷却効果を高めることができる。すなわち、液体容器が固定されている場合、液体容器内の液に温度境界層ができ容器内での熱伝達が悪くなる。これに対して、液体容器を回転させると容器内での温度境界層の発生を抑制することが出来、冷却効果を向上させることができるものである。円筒状の液体容器を一定速度で回転を継続すると、容器内壁近傍の液は粘性によって回転運動を起こし、液体容器内の液全体が回転運動を行うことになり、その回転速度は径が大きい外側ほど早い分布を持っている。回転運動にともない液に遠心力が作用し、容器内壁近傍の冷えた液が液体容器内の外側にとどまり壁面付近の温度勾配が小さくなる。この傾向は、径の大きな液体容器において顕著なものとなるため、液体容器の回転速度を変えたり間歇回転させることによる冷却効果の向上は、冷却に時間の掛かる大きな液体容器においてより効果的なものとなる。

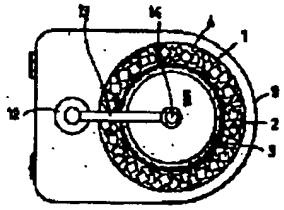
【図面の簡単な説明】
【図１】本発明の液体容器冷却装置の一例を示す縦断面図。
【図２】図１の冷却装置の蓋を除いた平面図。
【図３】液体容器内の液体の注出器を備えた冷却装置の一例を示す冷却装置全体の縦断面図。
【図４】本発明の別の実施形態の冷却装置の一例を示す縦断面図。
【図５】図４の冷却装置の横断面図。
【図６】容器本体の内部に配置する保護枠の一例を示す斜視図。
【図７】容器本体の内部に配置する保護枠の別の一例を示す斜視図。
【図８】断面変形アタッチメントを装着して使用する実施形態の冷却装置全体の縦断面図。
【図９】図８の冷却装置に使用する断面変形アタッチメントの分解斜視図。
【図１０】断面変形アタッチメントの変形例を示す斜視図。
【符号の説明】
１…本体容器、　２…保護枠、　３…冷水室、　４…氷室、　５…液体容器、６…回転台、　７…突起物、
８，２８…断面変形アタッチメント、　８′…掴め上げ部、
８ａ…基部、　８ｂ…脚片、　８ｃ…凹み部、　８ｄ…ネジ部、　８ｅ…取付部、９…本体、　１０…断熱剤、　１１…蓋、　１２…モータ、　１３…動力伝達杆、　１４…支持杆、
１５…保持手段、　１６…注出器、　１７…注出パイプ、
１８…コック、１９…キャップ、　２０…吸引パイプ、　２１…圧力パイプ、　２２…注ぎ口、　２３…制御器、　２４…架台、　２５…作動モータ、　２６…孔、　２７…スリット。

[첨부그림 6]

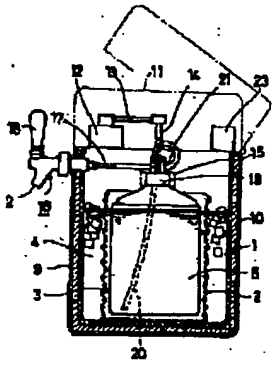
[도 1]



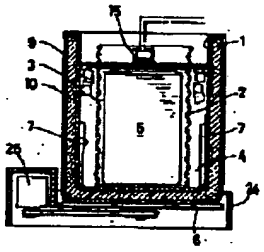
[도 2]



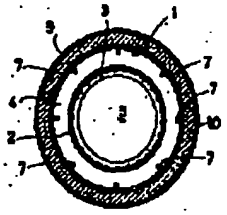
[도 3]



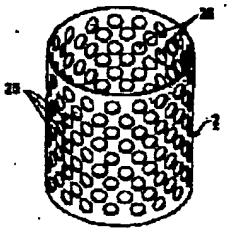
[도 4]



[도 5]

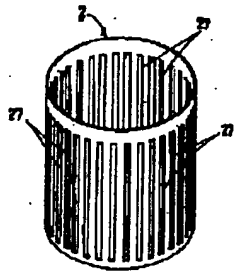


[도 6]

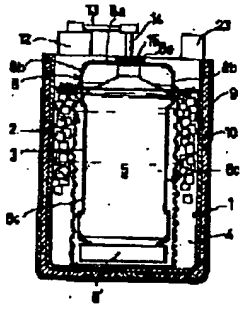


[첨부그림 7]

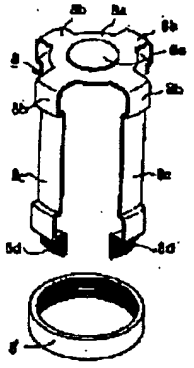
[도7]



[도8]



[도9]



[도10]